Matrix acquires evco - the joining of two top-tier companies.

You’ve known us for more than 30 years as a leader in construction, fabrication, repair and maintenance and now Matrix offers premier global engineering services for ammonia and urea systems, material handling for fertilizer and grain facilities, sulfur technology from liquid storage, forming to melting and construction services for balance of plant.
CONTENTS

03 Comment
05 World News
12 India’s Fertilizer Journey
K. Ravichandran, Ankit Deora and Aditya Jhavar, ICRA Ltd, India, review the supply and demand trends for nitrogenous and P&K fertilizers in India and where the industry is heading.
18 Cornucopia: The North American Big Build
A huge amount of new nitrogen fertilizer capacity is coming onstream in North America. Gordon Cope, World Fertilizer Correspondent, details the recent fertilizer renaissance and where this could lead.
24 A Natural Boost
Richard Ewing and Deepika Thapliyal, ICIS, UK, analyse natural gas as an increasingly powerful resource for fertilizer manufacturing.
31 Chemical Beneficiation
Laurent Palierne, EcoPhos, Belgium, details a number of new and sustainable processes that make use of low-grade phosphate rock.
37 The Alternative Route
Ravi Chandran and Dave Newport, ThermoChem Recovery International (TRI), USA, outline an alternate reforming technology for distributed ammonia production.
41 Reforming Reliability
Erwin Platvoet, John Zink Hamworthy Combustion, USA, illustrates a comprehensive approach to optimising primary reforming furnace reliability.
48 Light At The End Of The Tunnel
Tanner Howell, BD Energy Systems, USA, compares conventional tunnel construction and design to the company’s improved tunnel design to achieve improved fluegas flow uniformity.
54 The Right Balance
John Brightling, Johnson Matthey, UK, and Bilal Tai, Johnson Matthey, Malaysia, illustrate the importance of balancing tube wall temperatures to improve overall energy efficiency, primary reformer methane slip and plant production, as well as ammonia plant operational safety and equipment reliability.
63 Staying On Track
G. Manenti, V. Pescuma and S. Sarti, Alfa Laval Olmi SpA, Italy, provide an overview of the delivery schedule for a key piece of heat transfer equipment, process gas boiler packages, to fertilizer plants.
69 Sulfur: Bringing The Heat
Chance Carrick, Koch Heat Transfer Co. LP, USA, discusses sulfur and considerations for heating.
71 Clearing The Air
Corey Smith and James Kelly Merritt, Jr, Grannus LLC, USA, detail the company’s latest emissions control technologies that are helping a California ammonia plant efficiently produce ammonia and meet air quality control standards.
77 The Need For Speed
Ali Rasha-Enders, Kobelco Machinery Europe, Germany, and Tsukasa Shiga, Kobelco Compressors America Inc., USA, detail the advantages of integrally geared centrifugal compressors.
81 Closing The Global Nutrient Loop
Ludwig Hermann, Outotec, Germany, touches upon the challenges and opportunities of marketing a new generation of fertilizers from recycled materials.
85 Waste Not, Want Not
Ing. Luigi Lisciandra, SBS Steel Belt Systems S.r.l., Italy, details the company’s development of sulfur-based bio-fertilizers.
89 Stepping Up Prilling And Granulation
Rinat Anderzhonov and Nikolay Shestakov, NIIK, Russia, outline recent developments the company has undertaken in fertilizer prilling and granulation.
96 15 Facts ...
This month we give you 15 facts on India!

ON THE COVER

EcoPhos offers an economic, sustainable and proven technology to produce high-quality phosphate from any type of phosphate rock. This method – using hydrochloric acid – saves water, increases worldwide phosphate reserves and produces useful co-products. EcoPhos, through its subsidiary Aliphos, is also a market leader in Animal Feed phosphate.

For more information: www.ecophos.com
From mixing of liquid melts and solid additives, through environmentally-friendly Rotoform pastillation, to downstream handling and bagging, our continuous process solutions open the door to new possibilities in profitable, innovative and effective multi-nutrient fertilisers.

- Inline mixing of liquid and solid suspensions
- Uniform, dust-free Rotoform pastilles
- Ultra-versatile production for easy product switchover
- Low investment, low operating costs
- Single source, end-to-end capability

CONTACT US TO FIND OUT HOW WE CAN ENHANCE YOUR PRODUCTS
“If you build it, they will come”

Misquotes from movies are much more prevalent in everyday popular culture than you might think. We use them all the time and the more they are repeated, the more they become ingrained in our collective consciousness. In the original films, Tarzan never said, “Me Tarzan, you Jane”, nor did Darth Vader say, “Luke, I am your father!” Similarly, Dirty Harry didn’t utter the infamous line, “Do ya feel lucky, punk?” Bogart and Bergman never quite said, “Play it again Sam” and no one ever demanded “Beam me up Scotty” in Star Trek. In each case, what they said was very close but not these precise words, which over time have been disseminated into popular jargon.

The title of this comment is no different. Whilst wandering around his cornfield in ‘Field of Dreams’, Kevin Costner actually hears the words, “if you build it, he will come”. However, ever since the film was released in 1989, the phrase has been oft misquoted, particularly by the business community, and has come to represent a tacit justification for commercial endeavour. It is arguably not the soundest investment advice; we can all attest to the construction of ‘white elephant’ projects that never found a market, but in the case of the fertilizer sector, it rather aptly characterises the quite staggering renaissance that is currently underway in the US.

As recently as the 1970s, domestic nitrogen fertilizer production in the US represented approximately 85% of the total 20 million tpy fertilizer product consumed. While this consumption figure has remained steady over the ensuing years, the US share of this market had dipped to approximately 50% by the 1990s and, by 2005, more than 55% of nitrogen fertilizer was imported. Over the same period, roughly 60 US fertilizer producers had dwindled to a mere 14 and the industry was barely recognisable.

Fast forward to the present day and there is fundamental change afoot in the US fertilizer sector. The catalyst for this change has been the shale gas revolution. Natural gas is the key component in the nitrogen manufacturing process in terms of both feedstock and operating costs. With the cost of natural gas at record lows in the US and projected to remain at these levels for the foreseeable future, fertilizer manufacturing is an ideal means of monetising this low-cost resource and regaining lost market share. There are currently at least 12 projects under construction with the potential to lift US fertilizer production back up to 70% of domestic demand and beyond. Indeed the reliability and availability of low-cost natural gas in the US means that this could well be a period of rapid and sustained growth in the US fertilizer sector, leading to the establishment of an export market for low-cost US producers. In this scenario, “We’re gonna need a bigger boat”, a frequent misquote from the 1975 movie Jaws, may in fact be spot on ...

Articles by Gordon Cope, Contributing Editor, on p. 18 and Richard Ewing and Deepika Thapliya, ICIS, UK, on p. 24 in this January/February issue of World Fertilizer provide considerably more detail on both the North American ‘Big Build’ and the key role of natural gas in the cost-effective manufacture of fertilizer.

We do hope that you enjoy the issue and wish you a happy and productive 2017. Finally, if you have not done so already, please download the World Fertilizer App. Further details can be found on p. 62.
Together facing a brighter tomorrow

At Yokogawa, we believe the sky’s the limit. And to reach beyond today’s horizons, we work step-by-step with you to make the unimagined a reality. That’s how we move forward, through the synergy of co-innovation partnership. Join hands with us, and together we can sustain a brighter future. Yokogawa: Building a better tomorrow with you today.

Please visit www.yokogawa.com/eu
C F Industries has reported its new nitrogen and urea plants at its Port Neal, Iowa, nitrogen complex have been successfully commissioned and started up, marking the completion of the company’s capacity expansion projects.

The ammonia plant, which began production in late November, has operated at approximately its nameplate capacity of 2425 short tpd. The back end of the plant (ammonia synthesis) was recently taken offline to replace a gasket and is expected to resume production shortly.

The front end of the ammonia plant continues to operate and produce carbon dioxide that is used to feed the new urea plant. The urea plant, which was commissioned in December, has produced on-specification granular urea. The urea plant was also recently taken offline to replace a relief valve and is expected to resume production shortly.

Total gross ammonia capacity at Port Neal is now 1.2 million short tpy, up from 380,000 short t previously. Output from the new ammonia capacity will largely be upgraded to urea. Total urea capacity at Port Neal is now 1.4 million short tpy, up from 50,000 short t previously. Total UAN capacity remains largely unchanged at 800,000 short tpy.

The Ethiopian Ministry of Public Enterprise has signed a US$2.4 billion partnership with OCP Group for the development of a world-class fertilizer platform, in the east of the country.

According to OCP Group, this is continuing the group’s commitment to the development of a south-south partnership, which is based on a common vision between Morocco and Ethiopia for sustainable agricultural development across Africa, and reinforces economic ties between the two countries.

The first phase of the US$2.4 billion investment will enable the production of 2.5 million tpy of fertilizer through 2022, rendering Ethiopia self-sufficient in fertilizer and creating opportunities for exports.

The plant, named Dire Dawa fertilizer complex, will produce fertilizer made from Ethiopian potash and ammonia gas, as well as OCP’s phosphoric acid.

According to a media release from OCP, the plant’s fully-integrated design will regroup logistics, production, raw materials access, storage and transportation, and will meet 100% of Ethiopia’s fertilizer demand with high-quality, competitively-priced and customised fertilizers. Excess capacity at the platform, coupled with its strategic location and a new railway connection granting access to neighbouring countries, will enable export to the regional market.

An additional investment of US$1.3 billion is expected to increase production to 3.8 million tpy by 2025 in order to meet growing local demand. At the end of this second installation phase, the plant will be made up of nine units and increase annual fertilizer production by 50%.
IN BRIEF

International
Black & Veatch and Casale SA have signed a global licensing and cooperation agreement that designates Black & Veatch as a licensee for Casale’s fertilizers, melamine, methanol and related chemical technologies. Under the terms of the agreement, Black & Veatch is granted a global licence to engineer a fertilizer (i.e. ammonia, urea, nitric acid, ammonium nitrate, urea ammonium nitrate, superphosphates and complex fertilizers) plant that uses Casale technologies.

Vietnam
Solvay and Petrovietnam Ca Mau Fertilizer Joint Stock Co. (PVCFC) have signed a memorandum of understanding (MoU) to launch innovative and eco-friendly enhanced efficiency fertilizers, which will increase yields for farmers while decreasing nitrogen losses in the air, soil and water, and in turn reduce environmental and climate impact.

Both parties have been conducting laboratory and field trials on rice, maize, coffee and pomelo/orange plantations at several locations in Vietnam since 2015. Under the terms of this agreement, the successful outcome of these trials will enable PVCFC to launch new innovative and eco-friendly enhanced efficiency fertilizers in the coming months.

International
Stamicarbon, part of Maire Tecnimont Group, and Schoeller Bleckmann Nitec (SBN), part of Christof Group, have signed a general cooperation agreement related to the fabrication of high-pressure equipment for urea plants.

The agreement includes the delivery of HP equipment using Safurex® stainless steel, based on Stamicarbon urea technology within 12 months after ordering, as well as SBN keeping sufficient standardisation material and ore-fabricated parts as stock.

AUSTRALIA SOP project site work commences
Site works have commenced at Kalium Lakes Ltd’s (KLL) Beyondie sulfate of potash (SOP) project, 160 km southeast of Newman in Western Australia.

This work is being undertaken on the granted Miscellaneous Licence (L52/162), which allows for installation of an access road, gas pipeline, water supply facilities, accommodation village, communications and other infrastructure. The Miscellaneous Licence was granted following the signing of a Land Access Agreement with the Gingirana Native Title Claim Group in March 2016. The agreement also allows for consent to the future grant of project tenure, project operations and project approvals.

The initial works have involved upgrading the 78 km access road, which connects the Great Northern Highway at Kumarina Roadhouse to the key Beyondie project area. These works have been undertaken while working closely with the local representatives of the Gingirana people to avoid any areas considered culturally significant by the traditional owners of the land.

Works are now focused on preparing the camp accommodation and infrastructure areas, followed by the installation of access tracks and water bore drill pads around the Beyondie, 10 Mile and Sunshine areas. Drilling will commence in 1Q17, subject to adverse weather conditions.

Managing Director, Brett Hazelden, indicated: “The upgrading of roads and future installation of the core accommodation and infrastructure facilities is a key step in providing the necessary backbone required for advancing and further de-risking the Beyondie sulfate of potash project.”

ERITREA FEED contract awarded for SOP development
Danakali Ltd has awarded Fluor Corp. a front-end engineering, design and optimisation (FEED) contract for the Colluli potash project.

Colluli is an advanced greenfield SOP development and is approximately 177 km southeast of the capital, Asmara, and 180 km from the port of Massawa.

“Fluor will provide a highly qualified design and optimisation team with world-class process infrastructure credentials for this important fertilizer project,” said Rick Koumouris, President of Fluor’s Mining & Metals business.

“We are delighted to be working with Fluor as we progress the Colluli project,” said Paul Donaldson, Managing Director of Danakali. “The combination of Fluor’s values, people, reputation, optimisation approach, mining and metals expertise, experience in Africa, and potash-specific experience will benefit the project significantly as it progresses towards construction.”

According to a media release, approval of the social and environmental impact assessment for the project was given by the Ministry of Land, Water and Environment in December 2016, and the award of the Mining Agreement and Mining Licence for the project is well progressed.
CLEANING AIR TODAY FOR A BETTER TOMORROW

- DeNO\textsubscript{x} & DeN\textsubscript{2}O Engineering & System Design
- SCR/N\textsubscript{2}O/NSCR Catalyst Supply
- Vessel & Catalyst Housing Fabrication
- Analyzers & CEMS Units

- First Class Products
- Customer Service Focused
- Cost Effective Solutions

ECSCATALYST.COM
International
ProSim has collaborated with Johnson Matthey Plc and, as a result of this partnership, Johnson Matthey will actively market and support the sales of ProSimPlus HNO3 software, while Johnson Matthey will be ProSim’s exclusive catalyst supplier customer within the nitric acid industry. Both companies will collaborate in flowsheeting simulation work by applying their expertise in the nitric acid industry as a service for customers, aiming to resolve issues and optimise plant operations.

China
K+S has successfully completed the purchase of the activities of Chinese fertilizer producer Huludao Magpower Fertilizers Co. Ltd. The company believes that with this production site in China, access to the southeast Asian growth markets will be improved. Magpower is one of the largest Chinese producers of synthetic mangesium sulfate (SMS), which is used as a fertilizer for oil palms, soybeans and sugar cane.

The site currently has a capacity of 90 000 t which can be doubled to 180 000 t in the foreseeable future.

Canada
Great Quest Fertilizer Ltd has renewed the Tilemsi and Tarkint Est permits for a further period of two years. Both permits, along with the Aderfoul permit, form part of the Tilemsi phosphate project.

USA Urea plant construction completed
Agrium Inc. has successfully completed construction of the urea plant at its nitrogen facility in Borger, Texas, within the previously disclosed revised timeline and cost parameters.

Commissioning of the new 610 000 t urea facility, of which 100 000 t of urea equivalent will be Diesel Exhaust Fluid (DEF), is underway and production is expected to commence in 1Q17. DEF is used to reduce nitrogen oxide (NOx) emissions in diesel vehicles and this product is expected to help further diversify Agrium’s end-markets.

“Achieving this critical milestone in our Borger nitrogen expansion project, on time and on budget, is another example of our commitment to operational excellence at Agrium. The project creates shareholder value by refreshing the asset to ensure its future longevity, provides improved supply chain integration as well as product diversification and availability in this important agricultural region,” commented Agrium’s President and CEO, Chuck Magro.

USA Californian ammonia plant making progress
Over the last few months, Grannus LLC has reported key contracts and licences that are part of the company’s regional-scale advanced ammonia plant, being built in Kern County, California.

In November, Air Liquide Global E&C Solutions was selected to license technology and provide engineering services for the production of hydrogen at the ammonia plant. The plant features a patented, ultra-low NOx emission natural gas to ammonia process. Air Liquide Global E&C Solutions will license oxygen-based Lurgi GasPOX technology and associated gas clean-up technologies. In addition, Air Liquide Global E&C solutions will prepare process design packages (PDPs) for the natural gas to hydrogen process.

Grannus also selected Haldor Topsoe to license its ammonia loop, shift catalyst and sulfur guard technologies for the production of high-purity ammonia. In addition, Haldor Topsoe will prepare process design packages (PDPs) for the hydrogen to ammonia process.

In December, Grannus then selected Plant Process Equipment (PPE) as its EPC management company. PPE will design the plant in modules that will be fabricated offsite and delivered as easily transportable skids ready for final assembly at the plant location. The modular design is expected to greatly decrease the cost and time required for construction.

The Grannus plant is expected to produce 250 short tpd of ammonia and operate below all applicable California air quality control standards. It will be the first ammonia plant to be built in California in more than 60 years and will be operational in 2019.
In today’s competitive syngas markets, the costs associated with unplanned downtime are high.

Quest Integrity’s Reformer Care solution is an integrity management system for the entire steam reformer. Our proprietary inspection technologies capture 100% of the data for the internal and external tube surfaces. Combined with our advanced engineering analysis and assessments, Quest Integrity enables you to minimize the risk of unplanned downtime and make confident real-time operating decisions.

- Failure mechanisms identified and quantified
- Fitness-for-service and remaining life assessments in accordance to API 579/ASME FFS-1
- Temperature correction software for more accurate tube temperature measurement

Get the information you need to confidently make decisions on your steam reformers.

To learn more about our inspection and engineering solutions, visit our website.
Vale has entered into a stock purchase agreement with the Mosaic Co. to sell its fertilizer business to Mosaic for US$2.5 billion, excluding its nitrogen and phosphate assets in Cubatão, Brazil.

Upon completion of the transaction, Vale will sell to Mosaic:

- The phosphate assets located in Brazil, except the ones based in Cubatão.
- Its shareholding position in Bayóvar, Peru.
- The potash assets located in Brazil, including the Carnalita project.
- The potash project based in Canada (Kronau). The inclusion of the Rio Colorado potash project in the transaction perimeter is subject to Mosaic’s agreement following appropriate diligence.

Vale’s assets located in Cubatão, which are mostly dedicated to nitrogen nutrients and accounted for an adjusted EBITDA of US$108 million in 2015, will be carved out from Vale before the completion of the transaction with Mosaic. Vale expects to explore the sale of Cubatão assets during 2017.

Consummation of the US$2.5 billion sale transaction is expected to occur in late 2017, subject to the completion of the carve-out of the Cubatão assets from Vale Fertilizantes, satisfaction of customary conditions precedent, including the approval of the Brazilian anti-trust authority (CADE) and of other antitrust authorities, and certain other operational and regulatory milestones.

USA Successful delivery of cooling system

In February, Everest Sciences Corp. announced it has received an order for the CleanChill™ cooling system and has shipped and achieved successful operations of the system at Cherokee Nitrogen of Cherokee, Alabama.

This is the second order from LSB Industries’ Cherokee plant. Cherokee Nitrogen LLC operates a 160 acre, multi-product facility on a 1300 acre site located on the bank of the Tennessee River in Cherokee. The modular CleanChill system was factory fabricated, and successfully installed at Cherokee Nitrogen. Although it has only been running for a short time, initial analysis shows that the system is meeting the promised performance, and that the plant is benefiting from increased ammonia production.

“We are excited to be working with Everest Sciences again, after the successful implementation of their ECOChill solution on our nitric acid plant,” said Ben VanVeckhoven, General Manager at Cherokee Nitrogen. “We are confident that their solution will allow us to increase our ammonia plant production above which we previously achieved with a rental cooling unit.”
The need for innovative solutions to meet agricultural demands has never been greater. At Solex, our leading edge heat exchanger technology, supported by our testing and proprietary thermal modeling process, results in a final product of superior quality and the lowest energy consumption per tonne.

www.solex­ther­mal.com
Agriculture has played an important role in the economic development of agrarian India with ~15% of the gross value added (GVA) and ~55% of the population depending on it. In the last 15 years, all Indian food grain production increased at a CAGR of 1.31% from 212.9 million t in 2001 – 2002 to 252.2 million t in 2015 – 2016. With only a marginal increase in acreage, the increase in the productivity levels plays a vital role in the growth of the agriculture industry, as fertilizers account for at least half of the crop yield. However, while India has the largest area of arable and permanently cropped land in the world, it ranks third in the world in overall food grain production, after China and the US, primarily due to low crop productivity. As a result, with limited...
arable land and rising food needs, the long-term potential for an increase in fertilizer usage is high.

**Demand trends for fertilizers**

The Indian fertilizer industry can broadly be divided into two categories, depending on the nutrient composition: nitrogenous fertilizers and phosphatic and potassic (P&K) fertilizers. The overall fertilizer consumption in India has grown at a CAGR of 3% from 44.8 million t in FY2007 to 58.2 million t in FY2016. During FY2016, the primary sales volumes for fertilizers grew at a moderate rate of 7% to 58.2 million t from 54.1 million t in FY2015, despite a second consecutive year of weak monsoons (Figure 1). While urea sales grew by 4% to 31.98 million t in FY2016 from 30.88 million t in FY2015, driven by higher production, non-urea sales growth remained moderate, growing at 13% to 26.19 million t in FY2016 from 23.24 million t in FY2015.

**Demand-supply scenario for urea**

The domestic consumption of urea has grown steadily at a CAGR of ~3% from 26.7 million t in FY2010 to 32 million t in FY2016. Demand for urea remains strong on account of its traditionally high usage and also the fact that freeing up of retail prices for non-urea fertilizers, following the implementation of nutrient-based subsidy (NBS) for these fertilizers has led to a significant price differential of urea vis-a-vis non-urea fertilizers. However, while consumption has grown at a 3% CAGR, production grew only at a CAGR of 1% from 21.1 million t in FY2010 to 22.5 million t in FY2015, due to lack of investments in urea over the past decade following lack of encouraging policy measures for greenfield and brownfield projects. However, domestic urea production increased by 8% to 24.5 million t in FY2016, led by favourable policy changes by the government of India (GOI), especially the New Urea Policy (2015) and the Gas Pooling Policy. Nevertheless, import dependence remains high with ~27% of the urea demand met by imports during FY2016 (Figure 2).

**Demand-supply scenario for non-urea fertilizers**

The Indian P&K fertilizer industry works under the NBS scheme w.e.f from 1 April 2010, as prices of these fertilizers have been partially deregulated. The performance of the Indian P&K fertilizers industry has remained volatile, with the introduction of the NBS due to economic issues (such as demand-supply, commodity prices and currency movements) and regulatory issues (such as subsidy delay). As a result, the domestic consumption of P&K fertilizers has been volatile with volumes fluctuating between 20.5 million t on the lower side and 31.5 million t on the higher side. However, during FY2016, P&K fertilizer sales volumes reported a 12% growth to 25.92 million t, driven by higher imports, which rose by 26% to 8.98 million t. The imports were dominated by DAP and NPKs, which grew on account of the unviable domestic production because of cost pressures arising from high prices of phosphoric acid and the rupee depreciating against the US dollar. Domestically manufactured P&K volumes therefore grew at a modest rate of 5% during FY2016. Import dependence, forex fluctuations, agro-climatic risks and retail price differentials of P&K fertilizers vis-a-vis urea continue to remain the key challenges for the industry.

**Monsoon trends and the impact on fertilizer demand**

A study of the trends in domestic fertilizer volume growth for the past 15 years (Figure 3) reveals that the correlation of monsoons and fertilizer sales in the past has not been very high; as fertilizer sales also depend on other factors, such as systemic inventory levels, reservoir levels and soil moisture levels. During the current fiscal year, the South-West monsoon has been normal and reported at 97% of its long period average, which augurs well for the Indian agriculture
sector. However, despite a normal monsoon, primary fertilizer sales volumes fell by 3% year-on-year to 27.77 million t during the first six months of FY2017, on account of high systemic inventory levels at the beginning of the year (Figure 4).

**Raw material/feedstock**

Natural gas is used as feedstock and fuel in the urea sector, forming 70 – 80% of the cost of production of urea depending on feedstock prices and the energy efficiency of the plant, and hence, access to a low-cost feedstock is critical to the competitiveness of units in a deregulated scenario. However, India does not have access to low-cost natural gas unlike the US, the Middle East and Russia. Out of its total gas consumption of 43.5 million m³/day (million metric standard cubic metre per day) in 2015 – 2016, about 25 million m³/day is being supplied through domestic sources, and the rest through imported R-LNG. This leads to a higher urea production cost and hence a higher subsidy burden for the GOI/industry. Gas pooling for the urea sector is therefore a step in the right direction, as it equalises the cost of gas procurement for the industry and prepares the industry for the eventual deregulation or direct benefit transfer (DBT) by standardising the energy cost over a period of time.

The P&K fertilizer industry is highly dependent on imports, even while India has large manufacturing capacities of DAP and NPK fertilizers. MOP is entirely imported (Figure 5). India imports significant quantities of the key raw materials, such as rock phosphate, phosphoric acid and ammonia. Also, with a limited number of global suppliers, the bargaining power of the Indian fertilizer players with these suppliers is limited to a certain extent. Thus, the industry faces both availability and pricing issues for key raw materials on a regular basis. Prices of key raw materials, such as phosphoric acid, have remained higher vis-a-vis end-products, such as DAP, in certain quarters of FY2016, making it unviable to undertake domestic DAP production and forcing the industry to rely increasingly on imports and thereby impacting the domestic manufacturers.

International prices and currency movements play a major role in determining the end-product prices and profitability for the various fertilizers (Figure 6).

**Profitability of major incumbents**

The Indian fertilizer industry sells its products to farmers below their cost of production and is eligible for subsidies from the GOI for notified fertilizers. The total realisation thus comprises the subsidy and the farm gate price (maximum retail price or MRP). However, the decomposition of realisation is different for urea and non-urea fertilizers.

The urea companies function under a ‘normative cost-return’ regime, wherein the retention price comprises subsidy and farm gate maximum retail price (MRP), which is fixed by the GOI.

\[
RP = \text{variable cost (energy + bags cost)} + \text{conversion cost} + \text{selling expenses} + \text{capital related charges (interest, depreciation and 12% RoE [return on equity])}
\]

On the other hand, in case of non-urea fertilizers (viz. DAP, NPK, MOP), the subsidy is fixed for a particular year and the players are free to fix their own MRP in line with the raw material prices.

**Profits for urea players**

While the Indian urea industry witnesses a favourable demand-supply scenario, the returns for the manufacturers have been under pressure in recent years due to subsidy...
Archiving lower than normative energy consumption (measured in GCal/tonne for production of urea) by taking up energy saving/conversion projects.

- Operating the plant consistently above the normative capacity utilisation level.

- Undertaking debottlenecking projects and producing beyond the cut-off capacity to earn import parity pricing (IPP)-based realisations.

### Table 1. Key financial metrics at various capacity utilisation

<table>
<thead>
<tr>
<th>Capacity utilisation</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum DSCR (times)</td>
<td>0.77</td>
<td>0.88</td>
<td>0.99</td>
<td>1.10</td>
</tr>
<tr>
<td>Average DSCR (times)</td>
<td>0.86</td>
<td>0.99</td>
<td>1.13</td>
<td>1.25</td>
</tr>
<tr>
<td>Project IRR (post-tax)</td>
<td>6.70%</td>
<td>9.23%</td>
<td>11.30%</td>
<td>13.30%</td>
</tr>
</tbody>
</table>

Source: ICRA research

### Profitability for P&K players

For the non-urea players, the profitability is largely based on the demand-supply balances, competitive raw material procurement and the currency movements, given that all the companies have to import raw materials. Profitability for these players remained weak during FY2012 – FY2015 as agro-climatic factors, high international commodity prices, depreciation of the rupee and a high build-up of inventory in the domestic market, all led to low profitability. Profitability margins remained relatively muted in FY2016 as well due to a demand slowdown with a consecutive year of weak monsoons.

Overall, high subsidy delays and weak RoCE across the industry remain major concerns. Nevertheless, the strategic importance of the sector in ensuring food security of the nation and the certainty of subsidy receipt from the GOI mitigate the above risks to some extent.

### Update on new projects

The capacity creation for the urea sector has lagged demand, arising from a not-so-encouraging investment policy framework. After the Urea Investment Policy of September 2008 failed to encourage any major expansion projects, the GOI approved the New Urea Investment Policy (NIP) in December 2012, under which the realisation of urea from new projects is benchmarked to import parity prices, subject to a floating floor and ceiling prices, which are, in turn, linked to gas prices, to effectively ensure 12% (floor) and 20% (ceiling) post-tax RoE. Subsequently, the DoF notified certain amendments to NIP-2012 in October 2014, and the term “guaranteed buyback” was removed. This move increased the marketing risk for the new plants by providing the GOI the flexibility to restrict the offtake from the plant and resort to additional import of urea and lower its subsidy outgo, if it was substantially lower than domestic procurement from the new plants. Also, urea plants – being energy and capital intensive – need to operate at full capacity to achieve the expected returns. As shown in Table 1, as capacity utilisation reduces, the key financial metrics for the new brownfield projects are adversely impacted.

Hence, private sector players, except Chambal Fertilizers and Chemicals Ltd, have not committed investments under the new policy. Most of the new investments are to be made by public sector undertakings (PSUs), including the revival of old units. Among the projects to be undertaken by PSUs, the first one to take off is a revival project at Ramagundam of Ramagundam Fertilizers & Chemicals Ltd, while the GOI is also looking at reviving old plants owned by Hindustan Fertilizer Corp. Ltd and Fertilizer Corp. of India Ltd in Barauni, Sindri and Gorakhpur, through a joint venture of Central PSUs (CIL, IOC and NTPC). Some of the players are also looking at opportunities to set up overseas plants in case they are able to get gas at reasonable prices.

### India’s impact on the global urea market

India is one of the largest players in the urea industry in terms of production, consumption and trade. It is the second largest producer of urea in the world, accounting for 11% of the global urea capacity. However, India’s domestic consumption is much higher than the domestic production and it is a net importer of urea. During the last few years, urea imports to India were reported to be high, at 8 – 8.5 million t which is 18 – 20% of the world urea exports. With such a high import requirement, India is a key market for the global fertilizer producers over the next 3 – 5 years, until the new projects are commissioned.

### India’s impact on the global phosphatic market

The global phosphate fertilizer industry is relatively well consolidated, compared to urea, with the top 10 producers accounting for around 65% of the total DAP and MAP capacity. Though India is the third largest producer of P fertilizers, a large proportion of P&K fertilizer and/or their raw materials are imported. During FY2016, India’s DAP imports stood at 6 million t, which forms 35 – 40% of the world trade in DAP. Hence, India enjoys a formidable position in the global phosphatic market as well, wherein any movement in India’s DAP demand impacts the international DAP prices. However, a relatively well consolidated industry structure for phosphates reduces India’s bargaining power to some extent.

### India’s impact on the global potash market

There are only a few large suppliers of potash fertilizers globally as potash mineral reserves are available only in
certain regions. As India does not have potash reserves, it imports its potash requirement of ~2.25 – 2.75 million tpy. India's potash consumption accounts for only about 5 – 7% of the global demand for potash, which provides it with moderate bargaining power. The contract between India and the potash suppliers follows the benchmark prices set by China whose imports form ~20% of the global potash demand. Hence, despite no domestic production, India enjoys a moderately dominant position in potash fertilizers as well, although the extent of the dominance is much lower than in the case of urea and phosphates.

**Outlook**

Overall, for FY2017, the upside in the overall volumes is likely to be limited at 2 – 4% due to high systemic inventory levels at the beginning of the year. Also, the recent GOI move to withdraw the legal tender character of Rs 500 and Rs 1000 denominated notes could negatively impact demand in the short term for fertilizer as it coincides with the sowing season for the winter crop. However, over the long term, the currency curbs are unlikely to cause any demand disruption with the expected easing of liquidity position and inherent long-term demand drivers.

The urea industry would continue to benefit from the subdued energy price environment, which is likely to keep cost of the production low. However, on the P&K front, profitability pressure should remain for the P&K players in FY2017, due to inventory losses brought about by the lower NBS subsidy and the fall in global prices of DAP/MOP and intermediates putting pressure on retail prices. Although the profits in the second half of FY2017 should be relatively better due to a further softening of raw material prices, the overall profits for FY2017 should remain weak due to the overwhelming impact of the weak performance seen in the first half of the year.

With regard to the subsidy issue, the industry continues to face liquidity issues due to the high outstanding subsidy, the timeline for which needs to be improved, being a big drain on the players' profitability. Although the proposed DBT scheme could solve this issue, its actual implementation is a major challenge and is likely to be operational over the long term. Meanwhile, the government needs to budget for the subsidy payouts suitably so that the subsidy backlog is removed. Nevertheless, the backlog will hopefully reduce somewhat by the end of the current fiscal year on account of the decline in domestic gas prices in 2016 – 2017, a downward revision in RasGas R-LNG prices, a reduction in the subsidy rates under NBS for P&K fertilizers, and a fall in urea IPP prices.

To conclude, ICRA believes that the GOI has taken some reformist measures in the recent past (such as gas pooling, the new urea policy and the change in the policy for beyond cut-off production), however, many more critical issues still remain to be resolved by the GOI.
THAT WAS A SAMPLE OF WORLD FERTILIZER® MAGAZINE

JANUARY/FEBRUARY ISSUE

DON’T WANT TO MISS OUT?
You will need to register to read the full edition. Please log in to www.worldfertilizer.com or alternatively click here to register for free!

For more information about World fertilizer subscription package, please contact us:

E: subscriptions@worldfertilizer.com
T: +44 (0)1252 718999